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ECONOMICS INFORMATION

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ECONOMICS OF SHEEP PRODUCTION, ONTARIO, 1987

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ECONOMICS OF SHEEP PRODUCTION

INTRODUCTION

Cost of production studies were initiated in 1987 in the cow-calf, beef feedlot and sheep enterprises. The studies were designed to determine revenue and cost relationships for an enterprise, as well as physical and resource information about the enterprise. This study was limited to the sheep portion of the total farm business. Thus only costs and revenues directly associated with the sheep enterprise were included.

Any harvested crop production, even if it was consumed completely by the sheep flock, was considered as a separate enterprise. Any home grown feed consumed by the sheep enterprise was considered a cost to it and was accounted for at fair market value.

Land, machinery, overhead or other production costs due to feed crops were accounted for in the price of the feed. Any profit due to crop production was not included in the sheep budget. Pasture was considered part of the sheep enterprise.

The data for this report was collected by visiting twenty-one sheep producers around the Province. Detailed information about each farm was processed for the year 1987. The survey included 5,864 ewes for an average flock size of 279 bred ewes. Although the average flock size in Ontario was less than 33 bred ewes, larger flocks were used to obtain farm records specific to the sheep. For the purpose of reporting budgets for different areas of Ontario, the Province was split into two areas: (1) Southern & Western Ontario, and (2) Eastern, Central & Northern Ontario.

METHODS AND PROCEDURES

Farm cooperators, from all five regions of Ontario were visited to collect the data. An enterprise balance sheet was extracted from the farm balance sheet. Sheep revenues, prices, costs, and input/output quantities were extracted from the farmer's record book. A sheep computer model was used to input the operator's data, and to prepare an enterprise analysis. The computer model was designed particularly for this purpose. Cooperators were provided with a printed copy of the analysis of their farm during the farm visit and adjustments were made following a discussion. Each cooperator's data were confidential and are only presented in an aggregate form.

When the survey was complete, all enterprise records were combined to give a weighted average revenue/cost per bred ewe, as well as weighted input/output information. Budgets were prepared for the two areas of Ontario and for Ontario as a whole. The budgets were completed on an accrued basis with the size of the breeding flock held constant.

REVENUES

All the lambs produced by the sheep flock are assumed to be sold as weaned lambs except for the withers needed to replenish the ewe flock due to normal culling and death loss. The withers kept for breeding are shown as a revenue at the value of a wither entering the herd. Cull ewe sales are not shown. The culling of sheep is represented by a cost based on the loss in value that occurs when a cull ewe is replaced by a wither entering the flock. The other revenues included were those generated by tax rebates, both fuel and property tax. The budgets generated assume that all ewes are enroled in tripartite stabilization.

FEED COSTS

All feed was budgeted at fair market value, based on local feed prices given by the cooperators surveyed. A large portion of the feed consumed on sheep operations was home grown.

The type of feed, its value and the quantities fed were attained from the cooperators. Actual quantities of feed fed was seldom recorded by the cooperators. The computer model calculated the feed requirements based on the feeds used by the farmer and the National Research Council's Nutrient Requirement Tables. These requirements were used to confirm the amount of feed needed during the year and were helpful to the cooperators in allocating their feed between enterprises.

Feed costs include all home grown and purchased feeds, supplements, salt/minerals/vitamins, pasture rentals and bedding. The costs associated with owned pasture are buried in several cost categories due to the difficulty in separating them. For the purpose of this study, pasture was considered part of the sheep enterprise.

INTEREST ON OPERATING CAPITAL

The average outstanding operating capital was calculated and interest was charged on both the debt and equity portion. The market value balance sheet generated determined the percent equity. The debt portion of operating capital was charged at 11.2 percent and the equity portion at 5.1 percent. Based on a 71 percent equity level, the average rate of interest on operating capital was 6.87 percent.

OTHER CASH EXPENSES

Hired labour was charged at the actual cost for labour hired to work with the sheep.

Machinery costs, including fuel, repairs, and interest on investment included only that proportion directly involved in the sheep operation. Machinery use included feeding, manure clean out, pasture maintenance and truck use. The cost of spreading manure was not included as it was assumed that the value of the manure to the crop enterprise equalled the cost of spreading. The cost of machinery due to cropping was included in the price of the feed since feed was priced at fair market value. Equipment rental and custom work consisted of truck or tractor rental. The cost of trucking lambs to market was included here.

Replacement of ewe and ram cost consisted of depreciation of the breeding flock. Rams were depreciated (straight line) over 4 years of use, and ewes were depreciated over 8.5 years. The bred ewe to ram ratio was 34 to 1.

Marketing charges include yardage, commission, insurance and the Ontario Sheep Marketing Agency License Fee. The costs included were the actual charges recorded and reflect the fact that not all lambs are sold through a stock yard or auction barn.

TERM INTEREST

An interest rate of 11.2 percent was charged on 29 percent of the value of the breeding livestock, machinery, buildings and land allocated to the sheep enterprise. This represents the portion of the operation financed by debt. The opportunity cost for interest on investment for the equity portion was included at the end of the budget and was calculated at 5.1 percent. This rate was used to represent the real or after inflation rate.

DEPRECIATION

Depreciation on buildings was calculated using the straight-line method and a rate of 5 percent. Both the market value and a salvage value were obtained from the cooperator.

Machinery compliments used in the sheep enterprise were assumed to be five years old. If machines were used for other farming operations, costs were adjusted for the proportion of time spent on the sheep enterprise. The declining balance method of depreciation was used, and a 15 percent rate to powered and a 10 percent rate to non-powered machines was applied.

GROSS MARGIN

The gross margin is the revenue (less the property tax rebate) minus the variable costs. This is the amount that the enterprise can contribute to the fixed costs.

NET ENTERPRISE INCOME

The revenue minus the total enterprise costs is the net enterprise income. This is the return to owner's equity, operator labour, management and risk.

BALANCE SHEET

The enterprise balance sheet only includes assets that are directly associated with the sheep enterprise. All assets are valued at market value. Current liabilities were those directly associated with the sheep enterprise. Term debt was allocated to the enterprise on a proportioned basis.

Figure 1. Balance Sheet per Bred Ewe, Ontario, 1987

	$		$
CURRENT ASSETS	34	CURRENT LIABILITIES . . .	24
Machinery	25		
Ewes	153		
Replacements	14		
Rams	8		
INTERMEDIATE	200	TERM LIABILITIES	102
Buildings	117	TOTAL LIABILITIES	126
Land (0.25 acres)	83		
LONG-TERM ASSETS . .	200	EQUITY	308
TOTAL ASSETS	434	TOTAL EQUITY & DEBT . .	434

Figure 2. Balance Sheet per Bred Ewe, Area 1, 1987

	$		$
CURRENT ASSETS	39	CURRENT LIABILITIES . . .	34
Machinery	27		
Ewes	149		
Replacements	12		
Rams	8		
INTERMEDIATE	196	TERM LIABILITIES	115
Buildings	148	TOTAL LIABILITIES	149
Land (0.22 acres)	132		
LONG-TERM ASSETS . .	280	EQUITY	366

Figure 3. Balance Sheet per Bred Ewe, Area 2, 1987

	$		$
CURRENT ASSETS	28	CURRENT LIABILITIES . . .	12
Machinery	23		
Ewes	157		
Replacements	14		
Rams	8		
INTERMEDIATE	202	TERM LIABILITIES	86
Buildings	82	TOTAL LIABILITIES	98
Land (0.25 acres)	28		
LONG-TERM ASSETS . .	110	EQUITY	242

Table 1. Annual Sheep Budget per Bred Ewe, Ontario, 1987

REVENUES	-- $ per bred ewe[1] --
New Crop Lambs	52.29
Light Lambs	29.48
Heavy lambs	69.88
Feeder Lambs	14.08
Wool	5.14
Fuel Tax Rebate	0.46
Property Tax Rebate	1.35
Tripartite Deficiency Payments	0.00
Total	172.68
Variable Expenses	
Purchase of Feeder Lambs	12.91
Feed - Home Grown Feeds at F.M.V.[2]	43.84
- Vitamin & Mineral	4.40
- Salt	1.04
- Pasture Rental	2.50
- Bedding	2.65
Hired Labour	2.60
Fuel, Oil, and Grease	2.77
Equipment Repair and Maintenance	3.33
Equipment Rental and Custom	1.72
Livestock Supplies	2.62
Veterinary and Medicine	6.35
Tripartite Premiums	1.40
Marketing Charges	2.24
Miscellaneous	2.34
Interest on Operating Capital	3.32
Replacement of Ewes and Rams (including death loss)	16.84
Total Variable Costs	112.87
Fixed Expenses	
Hydro	1.78
Telephone	0.61
Property Taxes	1.35
Building and Fence Repair	3.80
Property Insurance	1.54
Vehicle Registration and Insurance	0.25
Term Debt Interest (ewes, equipment, buildings, land)	13.01
Non-Cash Expenses	
Depreciation on:	
- Machinery and Equipment	1.81
- Buildings	4.08
TOTAL ENTERPRISE COSTS	141.10
GROSS MARGIN	58.46
NET ENTERPRISE INCOME	31.58
Interest on Investment in: (equity portion)	
- Ewes and Rams	5.82
- Machinery and Equipment	0.91
- Land and Buildings	7.75

Note: 1. This budget is based on an average flock size of 279 bred ewes.
2. F.M.V. - Fair Market Value

Table 2. Annual Sheep Budget per Bred Ewe, 1987, Area 1 and Area 2

	Area 1[1]	Area 2[2]
REVENUES	-- $ per bred ewe --	
New Crop Lambs	79.01	21.15
Light Lambs	21.16	39.18
Heavy Lambs	49.66	93.47
Feeder Lambs	26.16	0.00
Wool	5.30	4.95
Fuel Tax Rebate	0.58	0.31
Property Tax Rebate	1.73	0.90
Tripartite Deficiency Payment	0.00	0.00
Total	183.60	159.96
Variable Expenses		
Purchase of Feeder Lambs	24.01	0.00
Feed - Home Grown Feed at F.M.V.[3]	44.28	43.35
- Vitamin and Mineral	4.50	4.29
- Salt	0.66	1.48
- Pasture Rental	1.50	4.00
- Bedding	3.89	1.20
Hired Labour	2.46	2.76
Fuel, Oil, and Grease	3.07	2.42
Equipment Repair and Maintenance	4.22	2.28
Equipment Rental and Custom	1.47	1.67
Livestock Supplies	2.54	2.71
Veterinary and Medicine	5.24	7.64
Tripartite Premiums	1.40	1.40
Marketing Charges	1.93	2.60
Miscellaneous	1.97	2.77
Interest on Operating Capital	3.78	2.82
Replacement of Ewes and Rams (incl. death loss)	16.13	17.76
Total Variable Costs	123.05	101.15
Fixed Expenses		
Hydro	1.52	2.09
Telephone	0.55	0.68
Property Taxes	1.73	0.90
Building and Fence Repair	5.68	1.62
Property Insurance	1.69	1.37
Vehicle Registration and Insurance	0.24	0.25
Term Debt Interest (ewes, equipment, buildings, land)	15.47	10.13
Non-Cash Expenses		
Depreciation on:		
- Machinery and Equipment	1.95	1.64
- Buildings	5.28	2.69
TOTAL ENTERPRISE COSTS	157.16	122.52
GROSS MARGIN	58.82	57.91
NET ENTERPRISE INCOME	26.44	37.44
Interest on Investment in: (equity portion)		
- Ewes and Rams	5.67	5.99
- Machinery and Equipment	0.99	0.82
- Land and Buildings	10.58	4.48

Note: 1. The Area 1 budget is based on an average flock size of 287 bred ewes.
2. The Area 2 budget is based on an average flock size of 271 bred ewes.
3. F.M.V. - Fair Market Value

Table 3. Sheep Industry Indicators, 1987

	Units	Ontario	Area 1	Area 2
RESOURCE PERFORMANCE			- per bred ewe -	
Tillable Land	acres	0.57	0.56	0.57
Pasture Land	acres	0.25	0.22	0.29
Percent of Crop as - New Crops	percent	38	54	16
- Light Lambs	percent	22	14	33
- Heavy Lambs	percent	32	24	43
- Feeder Lamb	percent	9	16	0
- Replacement	percent	8	8	8
Feed Cost per Bred Ewe	$	54.43	54.83	54.32
Ave. Breedings per Ewe per Year	number	1.0	1.0	1.0
Annual Culling Rate	percent	11.7	12.7	10.6
Breeding Ewes to Ram Ratio		34:1	33:1	35:1
Lambs per Ewe per Year	number	1.43	1.51	1.34
VALUE OF ENTERPRISE PRODUCTION				
per Bred Ewe	$	157.97	157.28	158.75
TOTAL ENTERPRISE COSTS				
per Bred Ewe	$	141.10	157.16	122.52
Share of Total Enterprise Costs				
Feed	percent	38.6	34.9	44.3
Other Variable Costs	percent	41.4	43.4	38.2
Term Interest	percent	9.2	9.8	8.3
Depreciation	percent	4.2	4.6	3.5
Other Fixed Costs	percent	6.6	7.3	5.7
Total	percent	100.0	100.0	100.0
PROFITABILITY				
Net Enterprise Income per Bred Ewe	$	31.58	26.44	37.44
Gross Margin per Bred Ewe	$	58.46	58.82	57.91
Break Even Revenue per cwt of Lamb				
- C.O.P. Gross Margin	$	115.88	130.90	90.15
- Total Enterprise Costs	$	144.87	167.19	109.20
PERFORMANCE EFFICIENCY				
Capital Turnover Ratio	years	2.75	3.27	2.14
Cost Control Index	percent	19.99	16.81	23.58
LIQUIDITY & SOLVENCY				
Percent Equity	percent	71.0	71.0	71.0
Debt Structure	percent	18.7	22.5	12.0
Current Ratio		1.4:1	1.2:1	2.4:1
Equity	$	308	366	242
Working Capital	$	10	5	16

Table 4. Typical Annual Sheep Ration, Ontario, 1987

	-- Tonnes per Bred Ewe --
Mixed Hay (89 % D.M.)	0.409
Mixed Grain (89 % D.M.)	0.072
Pasture (35 % D.M.)	0.628
Vitamin/Mineral[a]	0.018

[a] The vitamin/mineral mix was usually a 7 percent calcium, 7 percent phosphorus mix with 200,000 international units of vitamin A per 25 kg bag.

Table 5. Average Feed Prices and Yields on Sample Farms, Ontario, 1987

	Price $/tonne	Yield tonnes/acre
Mixed Hay (89 % D.M.)	60	3.5
Mixed Grain (89 % D.M.)	125	1.4
Pasture (35 % D.M.)	-	2.2
Vitamin/Mineral	200	-

APPENDIX I

FORMULAS

1) VALUE OF ENTERPRISE PRODUCTION
= Lamb and Wool Sales + Tripartite Deficiency Payments

2) TOTAL COSTS = Total Enterprise Costs - Tax Rebate - Fuel Rebate

3) BREAK EVEN REVENUE PER CWT OF LAMB (GROSS MARGIN)
= (Variable Expenses - Fuel Tax Rebate) / Total cwts of Weaned Lamb

4) BREAK EVEN REVENUE PER CWT OF LAMB (TOTAL COST)
= (Total Enterprise Costs - Fuel Tax Rebate - Property Tax Rebate) / Total cwts of Weaned Lamb

5) CAPITAL TURNOVER RATIO = $\frac{\text{Total Enterprise Assets}}{\text{Value Enterprise Production}}$ = Years

6) COST CONTROL INDEX = $\frac{\text{Net Enterprise Income}}{\text{Value of Enterprise Production}}$ x 100

7) PERCENT EQUITY = $\frac{\text{Equity}}{\text{Total Enterprise Assets}}$ x 100

8) WORKING CAPITAL = Current Assets - Current Liabilities

9) CURRENT RATIO = $\frac{\text{Current Assets}}{\text{Current Liabilities}}$

10) DEBT STRUCTURE = $\frac{\text{Current Liabilities}}{\text{Total Liabilities}}$ x 100

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